CLAIMS

1. A liquid crystal display panel driving apparatus comprising:

a reference voltage generating unit provided with a serial unit including a plurality of resistors connected in series, a first switch for supplying a first potential in a first mode and a second potential lower than the first potential in a second mode to a terminal of said serial unit and a second switch for supplying the second potential in the first mode and the first potential in the second mode to the other terminal of said serial unit, for outputting the respective voltages from connection points between said plurality of resistors; and

a driving unit for receiving image data and said plurality of voltages output by said reference voltage generating unit and for selectively outputting one of said plurality of voltages and a plurality of voltages generated therefrom by voltage division by using resistors according to a value of said image data, for applying the voltage to a terminal of a pixel of a liquid crystal display panel.

2. A liquid crystal display panel driving apparatus comprising:

a reference voltage generating unit provided

with a serial unit including a plurality of resistors connected in series, a first switch for supplying a first potential in a first mode and a second potential lower than the first potential in a second mode to a terminal of said serial unit and a second switch for supplying the second potential in the first mode and the first potential in the second mode to the other terminal of said serial unit for outputting the respective voltages from connection points between said plurality of resistors; and

a driving unit for receiving image data and said plurality of voltages output by said reference voltage generating unit and for selectively outputting one of said plurality of voltages and a plurality of voltages generated therefrom by voltage division by using resistors according to a value of said image data, for applying the voltage to a terminal of a pixel of a liquid crystal display panel, as well as for outputting a median voltage between the first potential and the second potential for applying the voltage to the other terminal of a pixel of said liquid crystal display panel.

3. A liquid crystal display panel driving apparatus comprising:

a reference voltage generating unit provided

with a serial unit including a plurality of resistors connected in series, a first switch for supplying a first potential in a first mode and a second potential lower than the first potential in a second mode to a terminal of said serial unit and a second switch for supplying the second potential in the first mode and the first potential in the second mode to the other terminal of said serial unit for outputting the respective voltages from connection points between said plurality of resistors; and

a driving unit for receiving image data and said plurality of voltages output by said reference voltage generating unit and for selectively outputting one of said plurality of voltages and a plurality of voltages generated therefrom by voltage division by using resistors according to a value of said image data, for applying the voltage to a terminal of a pixel of a liquid crystal display panel, as well as for outputting the first potential in the first mode and the second potential in the second mode for applying the voltage to the other terminal of a pixel of said liquid crystal display panel.

4. The liquid crystal display panel driving apparatus as set forth in Claim 1, wherein

at least two resistors among said plurality

of resistors have different resistance values.

5. The liquid crystal display panel driving apparatus as set forth in Claim 2, wherein

at least two resistors among said plurality of resistors have different resistance values.

6. The liquid crystal display panel driving apparatus as set forth in Claim 3, wherein

at least two resistors among said plurality of resistors have different resistance values.

7. The liquid crystal display panel driving apparatus as set forth in Claim 2, wherein

at least two resistors among said plurality of resistors have different resistance values; and

voltages obtained by subtracting a median voltage between the first potential and the second potential from a plurality of voltages generated by voltage division by using resistors from the voltages constitute voltage pairs of substantially identical values of opposite polarities.

8. The liquid crystal display panel driving apparatus as set forth in Claim 1, wherein

the first switch and the second switch are

provided with a PNP bipolar transistor or a P-channel MOS transistor connecting the first potential and said serial unit, and an NPN bipolar transistor or an N-channel MOS transistor connecting the second potential and said serial unit.

9. The liquid crystal display panel driving apparatus as set forth in Claim 2, wherein

the first switch and the second switch are provided with a PNP bipolar transistor or a P-channel MOS transistor connecting the first potential and said serial unit, and an NPN bipolar transistor or an N-channel MOS transistor connecting the second potential and said serial unit.

10. The liquid crystal display panel driving apparatus as set forth in Claim 3, wherein

the first switch and the second switch are provided with a PNP bipolar transistor or a P-channel MOS transistor connecting the first potential and said serial unit, and an NPN bipolar transistor or an N-channel MOS transistor connecting the second potential and said serial unit.

11. The liquid crystal display panel driving apparatus as set forth in Claim 1, wherein

the first mode and the second mode alternate in a pixel at each vertical synchronizing period of image data.

12. The liquid crystal display panel driving apparatus as set forth in Claim 2, wherein

the first mode and the second mode alternate in a pixel at each vertical synchronizing period of image data.

13. The liquid crystal display panel driving apparatus as set forth in Claim 3, wherein

the first mode and the second mode alternate in a pixel at each vertical synchronizing period of image data.

14. The liquid crystal display panel driving apparatus as set forth in Claim 11, wherein

the first mode and the second mode alternate at each horizontal synchronizing period of image data.

15. The liquid crystal display panel driving apparatus as set forth in Claim 12, wherein

the first mode and the second mode alternate at each horizontal synchronizing period of image data.

16. The liquid crystal display panel driving apparatus as set forth in Claim 13, wherein the first mode and the second mode alternate at each horizontal synchronizing period of image data.

17. The liquid crystal display panel driving apparatus as set forth in Claim 11, wherein the first mode and the second mode alternate in each individual pixel of said image data.

18. The liquid crystal display panel driving apparatus as set forth in Claim 12, wherein the first mode and the second mode alternate in each individual pixel of said image data.

19. The liquid crystal display panel driving apparatus as set forth in Claim 13, wherein the first mode and the second mode alternate in each individual pixel of said image data.

20. The liquid crystal display panel driving apparatus as set forth in Claim 14, wherein the first mode and the second mode alternate in each individual pixel of said image data.

21. The liquid crystal display panel

driving apparatus as set forth in Claim 15, wherein the first mode and the second mode alternate in each individual pixel of said image data.

22. The liquid crystal display panel driving apparatus as set forth in Claim 16, wherein the first mode and the second mode alternate in each individual pixel of said image data.

23. The liquid crystal display panel driving apparatus as set forth in Claim 1, wherein the first potential is a source potential, and the second potential is a ground potential.

24. The liquid crystal display panel driving apparatus as set forth in Claim 2, wherein the first potential is a source potential, and the second potential is a ground potential.

25. The liquid crystal display panel driving apparatus as set forth in Claim 3, wherein the first potential is a source potential, and the second potential is a ground potential.

26. The liquid crystal display panel driving apparatus as set forth in Claim 1, wherein

said reference voltage generating unit is provided with

a plurality of serial units respectively including a plurality of resistors connected in series;

the first switch for supplying the first potential in the first mode and the second potential lower than the first potential in the second mode to a terminal of said serial unit selected out of said plurality of serial units according to a command from outside of the reference voltage generating unit; and

the second switch for supplying the second potential in the first mode and the first potential in the second mode to the other terminal of said selected serial unit; and

outputs the respective voltages from connection points of said plurality of resistors of said selected serial unit.

27. The liquid crystal display panel driving apparatus as set forth in Claim 2, wherein

said reference voltage generating unit is provided with

a plurality of serial units respectively including a plurality of resistors connected in series;

the first switch for supplying the first potential in the first mode and the second potential lower than the first potential in the second mode to a terminal of said serial unit selected out of said plurality of serial units according to a command from outside of the reference voltage generating unit; and

the second switch for supplying the second potential in the first mode and the first potential in the second mode to the other terminal of said selected serial unit; and

outputs the respective voltages from connection points of said plurality of resistors of said selected serial unit.

28. The liquid crystal display panel driving apparatus as set forth in Claim 3,

said reference voltage generating unit is provided with

a plurality of serial units respectively including a plurality of resistors connected in series;

the first switch for supplying the first potential in the first mode and the second potential lower than the first potential in the second mode to a terminal of said serial unit selected out of said plurality of serial units according to a command from

outside of the reference voltage generating unit; and

the second switch for supplying the second potential in the first mode and the first potential in the second mode to the other terminal of said selected serial unit; and

outputs the respective voltages from connection points of said plurality of resistors of said selected serial unit.

29. A liquid crystal display apparatus comprising:

said liquid crystal display panel driving apparatus according to Claim 1; and

a liquid crystal display panel.

30. A liquid crystal display apparatus comprising:

said liquid crystal display panel driving apparatus according to Claim 2; and

a liquid crystal display panel.

31. A liquid crystal display apparatus comprising:

said liquid crystal display panel driving apparatus according to Claim 3; and

a liquid crystal display panel.